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New records of lichens and lichenicolous fungi from Iran and their biogeographical significance

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Abstract — In this paper, 80 lichen taxa and 9 lichenicolous fungi are reported as new to Iran. These include a tropical element represented by *Lithothelium obtectum* and *Melanotopelia africana,* and a North American element with *Lecanora flowersiana, L. juniperina*, *L. percrenata,* and *L. wetmorei.* The full checklist is available on http://www.mycotaxon.com

Key words — lichenized fungi, new species records, biogeography

Introduction

The recently revised checklist of lichenized, lichenicolous, and allied fungi for Iran (Seaward et al. 2008) includes 632 records based on literature records and voucher material, which means an increase of 224 species as compared to an earlier list (Seaward et al. 2004). Nevertheless, the exploration of the Iranian lichen flora appears far from being complete, with Valadbeigi et al. (2010) and Haji Moniri & Sipman (2009) having added another 24 species new to this region. The present paper reports 89 additional lichens and lichenicolous fungi new to Iran.

Iran is one of the world's most mountainous countries and largely occupied by the Iranian Plateau. Extended lowlands exist only along the coasts of the Caspian Sea and in Khuzestan. The specimens for the present study were collected from six different provinces (Fig. 1) in areas with a wide range of ecological characteristics.

Fig. 1. Study areas in the six provinces:
I, Azarbayejan; II, Gilan; III, Gorgan; IV, Hamedan; V, Ilam; VI–VIII, Mazandaran.

Materials and methods

The study is based on material collected by the first author during 2004–2009. The specimens are deposited in TARI (the Research Institute of Forests and Rangelands, Tehran), with some duplicates in B (Botanischer Garten und Botanisches Museum Berlin) and the private herbarium of the first author (VH). The morphology of all specimens was studied with a stereomicroscope. The chemistry was mostly investigated by using standard spot tests. Identifications were confirmed by comparison with specimens kept in the herbarium of B or by consultation with specialists. In critical cases, chemical analyses were carried out using TLC following Orange et al. (2001), using Merck silica gel 60 F254 pre-coated glass TLC plates in solvent systems A, B', and C. Identification of the substances was confirmed by running the extract next to a reference sample with known chemistry (co-chromatography).

Phytogeographical discussion

These reports confirm that the lichen flora of Iran is mostly composed of boreal, mediterranean, and central-asian phytogeographical elements (often

widespread, as would be expected) but that it includes other lichen-floristic elements as well.

Species with a major distribution in the Himalaya and East Asia have been previously reported, such as *Cladonia awasthiana* Ahti & Upreti (Seaward et al. 2004, Ahti & Sohrabi 2006) and *Leptogium trichophorum* Müll. Arg. (Haji Moniri & Sipman 2009). Both occur in the northern mountain range, which can be considered a continuation of the Himalayas. *Cladonia awasthiana* seems widespread in the Hyrcanian forest area, while *L. trichophorum* is known so far only from a single collection around the 2500 m elevation in Northern Khorasan.

Pyrgidium montellicum (Beltr.) Tibell, reported by Seaward et al. (2004), was the first indication of a tropical element in the Iranian lichen flora. This species is mainly known from the Palaeotropics, although with outliers reported as far north as Italy (Tibell 1982, 1996). Three additional species with a predominantly tropical distribution are reported here from Iran: *Lithothelium obtectum* (Müll. Arg.) Aptroot, hitherto known to be pantropical and very common in India (Aptroot 1991); *Melanotopelia africana* Sérus. et al., known previously from tropical continental Africa, La Réunion (Sérusiaux et al. 2009) and Borneo (*Sipman 31228* in herb. B); and *Siphula decumbens* Nyl., known from the Neotropics and the Palaeotropics with an extension to Japan (Kantvilas et al. 2005). All were found in Iran along the Caspian coast in the Hyrcanian forest zone. However, the altitudinal range is 450–2600 m, and not all grow in forest habitats.

Some additional species appear to represent a North American element. This element had earlier been indicated by a group of lichens that are rather common in Iran and surroundings, although they are absent from Western Europe: *Ramalina sinensis* Jatta, *Lecanora thysanophora* R.C. Harris, and *Pyrenula subelliptica* (Tuck.) R.C. Harris (Seaward et al. 2008; for extra-Iranian distribution see Purvis et al. 1992, Brodo et al. 2001, Harris 1989). Based on the treatment of the North American representatives of the *Lecanora dispersa* group by Śliwa (2007), several further species are reported here: *Lecanora flowersiana* H. Magn., *L. juniperina* Śliwa, *L. percrenata* H. Magn., and *L. wetmorei* Śliwa. Of these only *L. percrenata* had been previously reported from outside North America, from Central Asia (Śliwa 2007). The species of this element seem to be widely distributed in Iran.

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